

Recovery Plan Action Status

Plan Name: Harper's Beauty

Plan Status: Final

Plan Date: 14-Sep-83

Lead Agency: USFWS

Lead Office: Panama City Ecological Services Field Office

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769-0552)

Species	Action Priority #	Action #	Action Description	Action Status	Est. Initiation Date	Est. Completion Date	Responsible Parties	Work Type	Labor Type	Action Comments
Harper's beauty (Harperocallis flava)	1	11	Secure sites on FS land	Ongoing Current	Prior to FY 1995		U.S. Forest Service	Management: General, Other: Administration, Other: Information and Education, Other: Law Enforcement, Other: Regulations	Internal Field Assistance, Internal Technical Assistance, Species Expert	To date, about 17 protected populations have been secured at Apalachicola National Forest (ANF), Liberty and Franklin counties. The ANF land is federal property and therefore, protected under the Endangered Species Act.
Harper's beauty (Harperocallis flava)	3	12	Encourage state to list	Complete	Prior to FY 1995	Prior to FY 1995	Florida Department of Agriculture and Consumer Services, Region 4 - Ecological Services	Other: Administration, Other: Regulations	Labor type not yet selected	DOACS has listed species as endangered. Need to find out actual date of listing.

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Harper's beauty (Harperocallis flava)	1	13	Secure sites on state right-of-ways	Not Started	Prior to FY 1995		Florida Department of Transportation, Region 4 - Ecological Services	Management: Habitat Maintenance and Manipulation, Other: Administration, Other: Law Enforcement, Other: Regulations	Labor type not yet selected	FS owns land along right of way, but FL DOT maintains a section along most important population. They adjust maintenance programs and mowing schedules to protect species . FY 06 violated mowing schedule which will prevent species from successfully seeding this year. This has been an issue off and on. Mainly making sure that DOT transfer info to their consultant responsible for mowing. FY06, DOT has proposed hwy widening project that may affect this corridor. FWS and FS involved in consultation process.
Harper's beauty (Harperocallis flava)	1	14	Secure sites on other land	Ongoing Current	FY 2000 - FY 2004		Region 4 - Ecological Services	Acquisition: Easement, Acquisition: General, Other: Information and Education, Other: Regulations	Labor type not yet selected	Consultants discovered new population in Bay County FL, expanding the known range. On St Joe Development CO lands. They plan to protect area as well as additional suitable habitat (approx 300 acres) through wetland mitigation for future projects.

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Harper's beauty (Harperocallis flava)	3	2	Conduct searches for new colonies	Ongoing Current	Prior to FY 1995		U.S. Forest Service, Florida Department of Transportation, Region 4 - Ecological Services	Other: Regulations, Research: Population Surveys	Labor type not yet selected	FS (on continuous basis), DOT consultants (HWY 65 widening project and proposed Gulf Coast Parkway), St Joe consultants (New Bay co area in adjacent suitable habitats) all conducting surveys in FY 05-07. In addition, FWS botanist, and Florida Natural Areas Inventory (FNAI). This recovery action is ongoing and conducted primarily by the Forest Service, FWS botanist, and Florida Natural Areas Inventory (FNAI). No populations of Harper's beauty were found on a 2008 survey conducted in the northwest portion of Tate's Hell State Forest (FDF 2008).
Harper's beauty (Harperocallis flava)	3	23	Train personnel in identification	Ongoing Current	Prior to FY 1995		U.S. Forest Service, Florida Department of Transportation	Research: Habitat Requirements, Research: Management Techniques	Labor type not yet selected	Louise Kirm, FS employee, for years has taught and depended on volunteers to teach how to survey for this species. She has survey protocol that is recommended.
Harper's beauty (Harperocallis flava)	3	31	Maintain representative colonies	Ongoing Current	FY 2006		U.S. Forest Service	Management: Propagation, Research: Propagation, Research: Reintroduction	Labor type not yet selected	FWS PCFO office contracted to Historic Bok Sanctuary FY 05 to initiate work in FY 06 and 07 for ex situ collection and protection of seeds from representative sites, not all sites.

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Harper's beauty (Harperocalis flava)	3	32	Deposit seeds in seed bank	Ongoing Current	FY 2006		U.S. Forest Service, Region 4 - Ecological Services	Research: Propagation	Contract	<p>FWS PCFO office contracted to Historic Bok Sanctuary FY 05 to initiate work in FY 06 and 07 for ex situ collection and protection of seeds from representative sites. FS has established cold storage seed bank in Macon, GA.</p> <p>The Historic Bok Sanctuary (Bok Sanctuary), Lake Wales, Florida, possesses 835 seeds in storage (416 in ambient conditions and 419 refrigerated) from a total of 1,312 seeds obtained from seven capsules collected in 2006 and 2007 by L. Keppner (Peterson and Campbell 2007) from the private owner of the Bay County population (L. Keppner, 2009, pers. comm.).</p> <p>The Historic Bok Sanctuary (Bok Sanctuary), Lake Wales, Florida, possesses 835 seeds in storage (416 in ambient conditions and 419 refrigerated) from a total of 1,312 seeds obtained from seven capsules collected in 2006 and 2007 by L. Keppner.</p>

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Harper's beauty (Harperocallis flava)	3	33	Deposit pollen in pollen bank	Not Started			U.S. Forest Service, Region 4 - Ecological Services	Work type not yet selected	Labor type not yet selected	Pollen bank has not been initiated but perhaps is not necessary because H. flava is primary selfing and lacks genetic variation.
Harper's beauty (Harperocallis flava)	3	34	Make seeds available for research	Partially Complete	FY 2006		Region 4 - Ecological Services	Management: Propagation, Research: Propagation	Contract	FWS PCFO office contracted to Historic Bok Sanctuary FY 05 to initiate work in FY 06 and 07 for ex situ collection and protection of seeds from representative sites.
Harper's beauty (Harperocallis flava)	3	35	Make seeds available for propagation	Ongoing Current	FY 2006		U.S. Forest Service, Region 4 - Ecological Services	Management: Propagation, Management: Reintroduction, Research: Propagation	Labor type not yet selected	FWS PCFO office contracted to Historic Bok Sanctuary FY 05 to initiate work in FY 06 and 07 for ex situ collection and protection of seeds from representative sites.
Harper's beauty (Harperocallis flava)	3	4	Establish additional colonies	Not Started			U.S. Forest Service, Region 4 - Ecological Services	Work type not yet selected	Labor type not yet selected	Not believed necessary at this time due to number of new location on ANF and new Bay County location. Wait to see if new "natural" sites are located between Bay and Liberty as well as on ANF.

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Harper's beauty (Harperocallis flava)	1	51	Collect baseline data	Ongoing Current	Prior to FY 1995		U.S. Forest Service, Florida Department of Transportation	Research: Demographic Studies, Research: Population Surveys	Contract, Internal Field Assistance, Species Expert	<p>Current populations have been mapped primarily by FNAI, the U.S. Forest Service (Forest Service), and the U.S. Fish and Wildlife Service (Service), and the following baseline data have been collected:</p> <p>Seed germination: Germination studies were conducted at Bok Sanctuary from seeds collected in 2006 and 2007 (Peterson and Campbell 2007). Of the 1,312 seeds, 477 were used in the seed experiments following Wagner and Spiralis (1996) germination protocol. Fifty-one percent of the seeds collected in 2007 germinated, while no germination occurred for the seeds collected in 2006. No additional work was pursued in 2008 (Campbell, Bok Sanctuary, 2009, pers. comm.).</p> <p>Wagner and Spiralis (1996) preliminary germination trials indicated that seeds are not dormant when they mature. Germination was high from freshly collected seeds grown at 21/10°C conditions and increased with cold stratification.</p> <p>Demography:</p>

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										<p>Walker and Silletti (2005) studied the population dynamics of <i>H. flava</i> in ANF for three years. The authors described the ramet size, reproductive status, and mortality and recruitment rates. Six sites were selected, 3 permanent plots/site were established totaling about 300 ramets/site, and individual ramets were marked. The total number of ramets declined from year to year. Larger ramets were more likely to produce reproductive structures, but the number of reproductive ramets was low and varied with site and year. Small ramets suffered higher mortality. Low recruitment and high mortality suggested that populations were declining possibly due to a decrease in precipitation. The authors observed crayfish induced ramet mortality but the effect of their activity at larger scales is unknown. Therefore, we do not have enough data for developing effective monitoring and management strategies for <i>H. flava</i>.</p> <p>Genetics: Godt et al. (1997) examined genetic diversity in 464 individuals</p>

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										<p>collected from ANF seepage bogs and roadside ROW. The authors found no discernable genetic variation between or among the populations; the species was monomorphic for the 22 loci scored. The lack of allozyme variation was explained by the possibility that the progenitors of <i>H. flava</i> had limited genetic diversity and/or that the species may have gone through several bottlenecks during its evolutionary history. Germination studies were conducted at Bok Sanctuary from seeds collected in 2006 and 2007.</p> <p>Herbert Kesler and Jennifer Trusty established in 2010 plots along roadside and natural forest populations in order to determine the effects of fire management and road modifications on this species. Fire effects: Preliminary results after one year of monitoring the 6 natural habitat populations indicate that prescribe fire has a strong influence on demographic rates. Fire promotes <i>H. flava</i> flowering and growth but increases mortality of ramets that have previously produced flowers.</p>

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										<p>Individuals had the greatest probability of flowering 1 year following a burn event. However, even after a burn, only 12-14% of individuals are expected to produce reproductive structures.</p> <p>Individual ramets were not found to flower multiple years in a row and flowering ramets were found to have lower survivorship than vegetative ramets the year of a burn event.</p> <p>These results are based on only one year of data and the effects of fire on population growth and recruitment will be established from future census data.</p> <p>The SR 65 roadside right-of-way supports large populations of <i>H. flava</i> but their importance to species persistence is unknown. Initial findings are that flowering individuals occur at higher densities along roadsides. Flower densities along roadsides averaged 8.3 flowers per meter square compared to 0.5 flowers per meter square in natural forest populations.</p> <p>Future censuses will help determine the survivorship, recruitment and population growth rate of these unique sites.</p>

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Harper's beauty (Harperocallis flava)	1	521	Identify pollinators and/or vectors	Partially Complete	FY 2000 - FY 2004	FY 2000 - FY 2004	U.S. Forest Service	Research: Habitat Requirements, Research: Other Information	Graduate Student	Pitts-Singer et al. (2002) studied the pollinator-plant relationship at two sites located on the ANF. The authors observed five insect species visiting the flowers, but only halictid bees gathered pollen from the flowers. According to the pollination study conducted by Wagner and Spira (1996), selfing might be the main reproductive mechanism for H. flava; this would explain the lack of genetic diversity. Therefore, pollinator services are potentially not necessary for this species, but the flowers' pollen may be a food resource for the bees.
Harper's beauty (Harperocallis flava)	1	5221	Study hydrology	Unknown			U.S. Forest Service, Region 4 - Ecological Services	Work type not yet selected	Labor type not yet selected	Funding included in 5221
Harper's beauty (Harperocallis flava)	1	5222	Study light relations	Not Started			U.S. Forest Service, Region 4 - Ecological Services	Work type not yet selected	Labor type not yet selected	Funding included in 5221
Harper's beauty (Harperocallis flava)	1	5223	Study competition	Unknown			U.S. Forest Service, Region 4 - Ecological Services	Work type not yet selected	Labor type not yet selected	Funding included in 5221

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Harper's beauty (Harperocallis flava)	1	53	Monitor colonies	Ongoing Current	FY 2000 - FY 2004		U.S. Forest Service, Florida Department of Transportation	Work type not yet selected	Labor type not yet selected	A three-year monitoring study was conducted by Walker and Silletti (2005). This year 2010, Herbert Kesler and Jennifer Trusty initiated an evaluation and Conservation of Harperocallis flava; the objectives of this project are: 1) to determine the current status of H. flava populations in the ANF; 2) to estimate the fire frequency and season that maximizes population growth rates for this species; 3) to identify which stage in the plants life cycle management can target to ensure the persistence and success of populations; and 4) to determine how road right-of-way population demographics compare to non-roadside populations. Based on these analyses, we will make recommendations to help to focus management practices for this federally listed plant.
Harper's beauty (Harperocallis flava)	1	541	Do experimental burns	Not Started			U.S. Forest Service	Work type not yet selected	Labor type not yet selected	
Harper's beauty (Harperocallis flava)	1	542	Do experimental mowing	Not Started			Florida Department of Transportation	Work type not yet selected	Labor type not yet selected	Mowing is a common practice to maintain rights-of-way (ROWs) in Florida. This action has not been initiated

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Harper's beauty (Harperocallis flava)	1	543	Remove competition manually/mechanically	Ongoing Current	FY 2000 - FY 2004		U.S. Forest Service	Management: Habitat Maintenance and Manipulation, Management: Predator and Competitor Control	Internal Technical Assistance, Volunteer	FS under good mgt with regard to Harpers Beauty through their burn program.
Harper's beauty (Harperocallis flava)	1	544	Determine effects of herbicides	Not Started			U.S. Forest Service, Florida Department of Transportation, Region 4 - Ecological Services	Work type not yet selected	Labor type not yet selected	

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Harper's beauty (Harperocallis flava)	1	545	Prepare management recommendations	Ongoing Current	FY 2000 - FY 2004		U.S. Forest Service, Florida Department of Transportation	Management: Habitat Maintenance and Manipulation, Management: Planning	Labor type not yet selected	<p>Management/general monitoring in ANF: Management is an ongoing action conducted by the Forest Service. The ANF has a yearly 120,000+ acre prescribed burning program (L. Kirn, Forest Service, 2009, pers. comm.). According to L. Kirn (2009, pers. comm.), two to three compartments are burned every year during the growing and dormant seasons.</p> <p>Management of ROW: Mowing is a common practice to maintain rights-of-way (ROWs) in Florida, and the Florida Department of Transportation (FDOT) has implemented a program of reduced mowing along state highways in order to decrease costs for maintenance roadsides and to encourage the growth of native wildflowers (Keppner, Keppner Biological Services, 2009, pers. comm.). Apalachicola National Forest SR 65 is under a restrictive mowing schedule due to the occurrence of the Harper's beauty within the ROW (L. Haddock, FDOT, 2009, pers. comm. to Negron-Ortiz). Protective measures such as restricting the</p>

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										<p>amount of area and timing of mowing were established in the early 1990s to allow seeds to mature and disperse. Currently, these measures are inadequate. For instance, a reoccurring problem of unauthorized mowing outside of dates specified had occurred over the past decade (S. Simpkins 2006, pers. comm. to D. Wolfe, FDOT). Thus, alternative measures should be sought.</p> <p>In addition to mowing restrictions, the Forest Service only allows spot treatment application of herbicide in the ANF to control invasive and exotic species.</p>
Harper's beauty (Harperocallis flava)	3	6	Public education	Ongoing Current	FY 2006		U.S. Forest Service, Florida Department of Transportation, Region 4 - Ecological Services	Work type not yet selected	Labor type not yet selected	FWS biologist, Pkelly gave presentation at Rare Plant Task Force Workshop on status of federal plants including H. Beauty. Louise Kirn has volunteer program which informs folks of plant as well as assists in surveys.